

CLAIMS<sup>ε</sup>

1. A polypeptide having at least 80% homology to the amino acid sequence of SEQ ID NO: 1; having an amino acid sequence, wherein at least an amino acid residue at position 39, 84, 296, or 300 from the N-terminus is Ala, an amino acid residue at position 85 is Thr, 5 an amino acid residue at position 163 or 333 is Ser, an amino acid residue at position 195 or 257 is Leu, an amino acid residue at position 271 is Arg, an amino acid residue at position 297 is Asp, an amino acid residue at position 313 is Pro, or an amino acid residue at position 316 is Val, in correspondence with the amino acid sequence of SEQ ID NO: 1; and having immunogenicity inducing the production of an antibody against a polypeptide 10 comprising the amino acid sequence of SEQ ID NO: 1.
2. The polypeptide according to claim 1, wherein the homology is at least 90%.
3. The polypeptide according to claim 1, wherein the homology is at least 95%. 15
4. A polypeptide comprising the amino acid sequence of SEQ ID NO: 1.
5. A polypeptide fragment having a partial sequence of the amino acid sequence of SEQ ID NO: 1; or a partial sequence of an amino acid sequence having at least 80% homology to the amino acid sequence of SEQ ID NO: 1, wherein at least an amino acid residue at position 39, 84, 296, or 300 from the N-terminus is Ala, an amino acid residue at 20 position 85 is Thr, an amino acid residue at position 163 or 333 is Ser, an amino acid residue at position 195 or 257 is Leu, an amino acid residue at position 271 is Arg, an amino acid residue at position 297 is Asp, an amino acid residue at position 313 is Pro, or an amino acid residue at position 316 is Val, in correspondence with the amino acid 25 sequence of SEQ ID NO: 1; and having immunogenicity inducing the production of an antibody against a polypeptide according to claim 4.
6. A composition for producing an antibody specific to a polypeptide according to 30 claim 4, comprising at least one selected from the group consisting of a polypeptide according to claim 1, a polypeptide according to claim 4, and a polypeptide fragment according to claim 5.
7. A method for the production of an antibody against a polypeptide according to 35 claim 4, comprising administering a composition according to claim 6 to a mammal.

8. An antibody specifically binding to a polypeptide according to claim 4.

9. The antibody according to claim 8, wherein the antibody is a polyclonal antibody or a monoclonal antibody.

5

10. A diagnostic kit for liver cancer or a precancerous condition of the liver, comprising an antibody according to claim 8.

11. A polynucleotide coding for a polypeptide having at least 80% homology to the  
10 amino acid sequence of SEQ ID NO: 1; having an amino acid sequence, wherein at least an  
amino acid residue at position 39, 84, 296, or 300 from the N-terminus is Ala, an amino  
acid residue at position 85 is Thr, an amino acid residue at position 163 or 333 is Ser, an  
amino acid residue at position 195 or 257 is Leu, an amino acid residue at position 271 is  
15 Arg, an amino acid residue at position 297 is Asp, an amino acid residue at position 313 is  
Pro, or an amino acid residue at position 316 is Val, in correspondence with the amino acid  
sequence of SEQ ID NO: 1; and having immunogenicity inducing the production of an  
antibody against a polypeptide according to claim 4.

12. The polynucleotide according to claim 11, wherein the homology is at least 90%.

20

13. The polynucleotide according to claim 11, wherein the homology is at least 95%.

14. A polynucleotide coding for a polypeptide comprising the amino acid sequence of  
SEQ ID NO: 1.

25

15. A polynucleotide coding for a polypeptide fragment having a partial sequence of the  
amino acid sequence of SEQ ID NO: 1; or a partial sequence of an amino acid sequence  
having at least 80% homology to the amino acid sequence of SEQ ID No: 1, wherein at  
least an amino acid residue at position 39, 84, 296, or 300 from the N-terminus is Ala, an  
30 amino acid residue at position 85 is Thr, an amino acid residue at position 163 or 333 is  
Ser, an amino acid residue at position 195 or 257 is Leu, an amino acid residue at position  
271 is Arg, an amino acid residue at position 297 is Asp, an amino acid residue at position  
313 is Pro, or an amino acid residue at position 316 is Val, in correspondence with the  
amino acid sequence of SEQ ID NO: 1; and having immunogenicity inducing the  
35 production of an antibody against a polypeptide according to claim 4.

16. A polynucleotide comprising a nucleotide sequence from positions 436 to 1413 of SEQ ID NO: 2.

17. A vector comprising a polynucleotide according to any one of claims 11, 14, 15,  
5 and 16.

18. A host cell transformed with a vector according to claim 17.

19. A method for the production of a polypeptide according to claim 1 or claim 4 or a  
10 polypeptide fragment according to claim 5, comprising culturing a host cell according to  
claim 18 under a condition capable of producing the polypeptide or the polypeptide  
fragment and then collecting the polypeptide or the polypeptide fragment.

20. A PCR primer comprising at least 15 nucleotides corresponding to a polynucleotide  
15 coding for a polypeptide comprising the amino acid sequence of SEQ ID NO: 1.

21. A PCR primer comprising at least 15 nucleotides corresponding to a polynucleotide  
complementary to a polynucleotide coding for a polypeptide comprising the amino acid  
sequence of SEQ ID NO: 1.  
20

22. A method for detecting a polynucleotide coding for a polypeptide comprising the  
amino acid sequence of SEQ ID NO: 1, comprising using PCR primers according to claim  
20 and claim 21 to perform PCR.

25 23. A kit that detects a polynucleotide coding for a polynucleotide comprising the  
amino acid sequence of SEQ ID NO: 1, comprising PCR primers according to claim 20  
and claim 21.

30 24. An RNA molecule comprising 15 to 25 nucleotide pairs, comprising a nucleotide  
sequence corresponding to a partial sequence of a nucleotide sequence from positions 436  
to 1413 of SEQ ID NO: 2, or a mutant nucleotide sequence of the nucleotide sequence with  
the addition, deletion, or substitution of at least one base, and suppressing the expression of  
a protein specific to human liver cancer.  
35 25. The RNA molecule according to claim 24, comprising 18 to 24 nucleotide pairs.

26. The RNA molecule according to claim 24, comprising 21 to 23 nucleotide pairs.

27. The RNA molecule according to claim 24, wherein the specific protein is a protein having the amino acid sequence of SEQ ID NO: 1 or a mutant protein thereof.

5

28. The RNA molecule according to claim 24, wherein the mutant protein is a protein having an amino acid sequence having 80% homology to the amino acid sequence of SEQ ID NO: 1.

10 29. The RNA molecule according to claim 24, wherein the mutant protein is a protein having an amino acid sequence having 90% homology to the amino acid sequence of SEQ ID NO: 1.

15 30. The RNA molecule according to claim 24, wherein the mutant protein is a protein having an amino acid sequence having 95% homology to the amino acid sequence of SEQ ID NO: 1.

31. An RNA molecule comprising the nucleotide sequence of SEQ ID NO: 10.

20 32. An RNA molecule comprising a mutant nucleotide sequence of the nucleotide sequence of SEQ ID NO: 10 with the addition, deletion, or substitution of at least one base, and suppressing the expression of a protein specific to human liver cancer.

33. The RNA molecule according to claim 24, wherein the RNA molecule has a hydroxyl group at the 3' end.

25

34. A pharmaceutical composition that suppresses the expression of a protein specific to human liver cancer, comprising an RNA molecule according to any one of claim 24 to claim 32.

30

35. A method for the production of a knockout cell, comprising introducing an RNA molecule according to any one of claim 24 to claim 32 to a cell expressing a protein specific to human liver cancer or a mutant protein thereof, and maintaining the cell under a condition bringing about RNA interference by the RNA molecule, to degrade mRNA transcribed from a gene coding for the specific protein or the mutant protein thereof.

35

36. A knockout cell produced by a method according to claim 34.
37. A kit for the functional analysis of a protein specific to human liver cancer, comprising an RNA molecule according to any one of claim 24 to claim 32.

5